

might indeed almost conclude that the masses of the comets are inappreciable. Let us briefly indicate the grounds for this important conclusion.

The sun and the planets form a system characterised by perfect order and symmetry. We have the sun in the centre. We have all the great planets moving round the sun in the same direction. They all move nearly in circles, and all these circles lie nearly in the same plane. This organisation is a necessary *modus vivendi* among the bodies of our system. Each planet acts and reacts upon all the other planets, but, owing to the circumstances of their movements, their irregularities are but small, and the permanence of the system is insured. Alter that system to any extent, merely reverse for example the direction in which one of the planets is moving, and the whole compromise is destroyed. The actions and reactions, instead of being quickly balanced, will go on accumulating, and the seeds of confusion and ultimate dissolution have been sown. But we have in our system thousands of comets which repudiate all the regulations by which the planetary convention is restrained. Comets come in what direction they please, they move in every plane but the right one, and their orbits are not in the least like circles. The very fact that our earth continues to revolve around the sun so as to be a fit abode for life, is a proof that comets cannot have any considerable mass. If comets had mass then organic disease would be introduced into the solar system which must ultimately prove fatal.

Science has gradually dissipated the fears which once invested comets : they are interesting and beautiful visitors which come to please and to instruct, never to threaten or to destroy.

#### NOTES

THE autumn Congress of the Sanitary Institute of Great Britain will be held this year at Dublin, and the programme of the proceedings has been issued. The President of the Congress is Sir Robert Rawlinson, C.B., who will open the Congress with an inaugural address on Tuesday the 30th inst., and the proceedings will last until October 4. The Congress is divided into three sections—the first, “Sanitary Science and Preventive Medicine”; the second, “Engineering and Architecture”; and the third, “Chemistry, Meteorology, and Geology.” Of the first section, the president is the Registrar-General for Ireland, Mr. Thomas W. Grimshaw, M.A., M.D. In the section of “Engineering and Architecture,” the president is the Engineering Inspector of the Local Government Board for Ireland, Mr. C. D. Cotton, C.E.; and the president of the section of “Chemistry, Meteorology, and Geology” is Mr. C. A. Cameron, M.D., the City Analyst and Superintendent Medical Officer of Health for Dublin. The sectional meetings and the general meetings will be held at Trinity College, where the opening address will be delivered on Tuesday evening by Sir Robert Rawlinson. On Wednesday morning the actual work of the Congress will commence with the address of the president of the first section, and the remainder of the day will be taken up with the reading of papers and their discussion, while a *conversazione* will be held in the evening. The business of the second section will be taken on Thursday, October 2, and in the evening a lecture will be delivered to the Congress by Dr. Alfred Carpenter on “Education by Proverb in Sanitary Work.” On Friday, after the third section, the closing general meeting of the Congress will be held. Arrangements for excursions will be made for the Saturday.

THE fifth International Congress of Hygiene, which has concluded its session at the Hague, is reported to have been highly successful ; it was decided to accept the invitation from Vienna for 1886.

IT is reported that Mr. Melville, chief engineer of the *Jeannette* Expedition, will command a Polar expedition which it is said will start next autumn to attempt to reach the Pole via Franz Josef Land. It is stated that Mr. Cyrus Field and the New York Yacht Club will each furnish one-half the cost of the expedition.

IN the course of the present month a geographical professorship will be established at each of the Russian universities. In Germany, fourteen out of twenty-one universities have a chair of this sort.

A VERY favourable Report has been issued of the second year of the College Hall of Residence for Women Students. That such an institution was wanted is shown by the fact that last autumn another house had to be added in order to meet the number of applications from students. The Hall is already almost self-supporting, and in another year will probably be entirely so ; and it is hoped that this will encourage friends to assist the Committee in paying off the £1000, they had to borrow in order to extend the premises. Subscriptions and donations may be sent to Mrs. Edward H. Busk, 44, Gordon Square, W.C.

THE Geographical Society have received a letter from Mr. H. H. Johnston, who has been sent out to explore and collect plants on Mount Kilimanjaro. It is dated June 18, from “Uvura, in Chagga, altitude 5000 feet.” “For nearly a week now,” Mr. Johnston says, “I have been settled on Kilimanjaro, camped on one of the loveliest sites in the world. Above me towers into the deep blue heaven the snowy head of Kibô, around me are green hills and forest-clad ravines in whose profound depths great cascades of water leap from rock to rock and splash the fronds of luxuriant ferns ; before me lies spread out a vast blue plain—‘all the world,’ as my host, the chief Mandara, proudly says, and my view southward is only bounded by the distant horizon. Perched as I am up here on the shoulder of a great buttress of the mountain, I seem to be on a level with the uppermost flight of the vultures, who hardly ever soar higher, and who poise themselves and wheel in circles over the awful depths at my feet. When the first cares of my installation are over, I am going to set to work on a picture such as I see before me, and call the view ‘à vol de vautour.’”

THE difference between the temperatures of places in America and those of places in similar latitudes in Europe is already well known, but it would hardly be expected to be so great as it actually was in January of this year. That month was a mild one all over Europe, but in the United States, especially in the eastern part, it was extremely cold. Thus, in Nashville and Knoxville, in the same latitude as Malta, the thermometer marked 26°·7 C. and 23°·3 C. of cold, while in Malta it was only 5°·9 below zero. At Indianapolis and Columbus it was 31°·7 C. and 28°·9 C. respectively below zero, while at Madrid, in the same latitude, the maximum was 9° below zero. The average temperature of the month in the States was 3° C. to 5° C. beyond the normal average.

THE experiment of MM. Renard and Krebs in balloon steering at Meudon, of which so much has recently been heard, formed the subject of a paper read before the Academy of Sciences on the 18th ultimo. The solution of the problem of aerial navigation was first attempted in 1855 by M. Giffard, who employed steam, then in 1872 by M. de Lôme, and finally by M. Tissandier, who was the first to apply electricity. The conditions which MM. Renard and Krebs studied to fulfil were steadiness of the path obtained by the shape of the balloon, and the arrangement of the rudder ; the diminution of resistance while travelling by the proportion of the dimensions—bringing together the centres of traction and resistance ; and finally, to attain a speed capable of resisting the winds prevailing in France during the greater part of the year. The paper then enters into details of the construction, and of the journey, during which the writers claim they were able to manoeuvre the balloon as easily and effectively as a ship is put through its evolutions.

WE have recently received from various scientific societies in the United States their late publications. The contents of these

are too numerous and too varied to be noticed now in any but the most general way. The New York Academy of Sciences appears to lead them all in the number and importance of the papers read before it, in every conceivable department of science. The Philosophical Society of Washington sends us vol. vi. of its *Bulletin*, containing the President's address (on "The Three Methods of Evolution"), as well as the abstracts of a large number of papers. This Society appears to work in conjunction with the Smithsonian Institution. The last number of the *Bulletin* of the Buffalo Society of Natural Sciences is almost wholly occupied with an elaborate paper on the plants of Buffalo and its vicinity, by Mr. Day, the present instalment being occupied by the Cryptogams. The toilers in the vineyard of science in the United States are evidently numerous and enthusiastic, and they have provided themselves with ample means of giving their results to the world.

THE last numbers of the "Encyklopädie der Naturwissenschaften" (Breslau, Eduard Trewendt) are Part 1, No. 37, and Part 2, Nos. 21 and 22. The first forms the continuation of the "Handwörterbuch der Zoologie, Anthropologie, und Ethnologie," and numbers among its writers Shellwald, Reichenow, Pfeiffer, Martens, Jäger, Röckl, and others. Among the articles in the present instalment are the pacing of horses, by Prof. Röckl; the brain, by Mojisisowics; and on the geographical distribution of animals, by Dr. Reichenow. No. 21 of Part 2 continues the section on mineralogy, geology, and palaeontology, and contains articles on islands, by Von Lasaulx; the Jura system, the formation of coal in the different geological epochs, and cryptogams, by Dr. Rolle. No. 22 belongs to the chemical section.

DURING the last fifty years several attempts have been made to form oyster banks in the Baltic. The first attempt was made about forty years ago, when a quantity of European oysters were laid down, but it proved a failure, and the oysters soon died. In recent years, however, experiments have been made with the American oyster (*Ostrea virginiana*), which, according to the researches of Prof. Möbius is a different variety of the European. The idea of laying down American oysters in the Little Belt was due to Mr. Meyer, an engineer of Hadersleben, who formed a company for the purpose of carrying it out, to which the Prussian Government granted a concession for forty years to form oyster banks up to lat. 55° N. In the autumn of 1879 Mr. Meyer went to the United States, whence he brought back to Hadersleben a million and a half small and half a million large oysters, which were laid down in ten different places from the Danish frontier to the southern part of the Als Sound. Recent examinations of these spots have shown varying results. In some there are only a few oysters left, and in others considerable quantities. Where seaweed is very plentiful the oysters have died. The best result was found on the south-east coast of Als. During the present summer fresh attempts at oyster-hatching are to be made in these parts, and the German Fishery Association has granted Prof. Möbius a sum of about fifty pounds towards expenses. On the west coast of Norway, too, strenuous efforts have been made in recent years to improve the oyster fisheries there, which were formerly very important. Several companies have been formed for acquiring old banks and restocking them. In some places the results have been very satisfactory.

THE Tung Wen, or Foreign Language College at Pekin, is about to issue a large work on Anatomy by Dr. Dudgeon of that place. It is said to contain prefaces, in the usual Oriental manner, from several of the highest officials at the capital. The work has over 500 cuts made at the Government expense. A large work on Physiology is also ready for the press; while Dr. Dudgeon has ready for the English press a little work on the diet, dress, and dwellings of the Chinese in relation to health.

IT is known that the Boyle-Marriott law is true only within certain limits, and that a gas submitted to great pressures, as well as to very low ones, ceases to obey it; the product received by multiplying its volume by its elasticity ceases to be a constant, and decreases under very low pressures: the elasticity decreases at a higher rate than the density of the gas, and to express the relations between the two, a more complicated formula must be resorted to. Another source of complication is due again to the condensation of the gases on the solid surfaces of the recipients, and if this cause be taken into account, the measured elasticities must be lower than the true ones, and in the rarefied gases the ratio between elasticity and density must increase with the increase of elasticity at a higher rate than would result from Prof. Mendeléeff's observations. Such was the idea that guided M. Kraevitch in a series of experiments he undertook a few years ago, with M. Petersen, in order to eliminate the influence of the condensation. These experiments being not sufficiently accurate, M. Kraevitch has now undertaken a new series of researches based on the rate of sound in different gases. They were carried on in tubes of very different lengths and diameters, and it appears from a preliminary communication, now published in the *Journal of the Russian Chemical Society* (vol. xvi. fasc. 6), that the air, when rarefied, does not obey at all the Boyle-Marriott law. The researches carried on on this principle promise to be, on the whole, very interesting, and may lead to conclusions of some value.

A SHOCK of earthquake occurred at Réunion on August 7 at midnight. The oscillation was from east to west, and was preceded by a loud report, like an explosion. No damage was done.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii* ?) from South Africa, presented by Major Newson D. Garrick; a Moustache Monkey (*Cercopithecus cephalus* δ) from West Africa, presented by Mr. G. A. Broderick; a Rhesus Monkey (*Macacus rhesus* δ) from India, presented by Mr. H. Johnson; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by the Rev. Walter Hudson; a Squirrel Monkey (*Chrysothrix sciurea*) from Brazil, presented by Mrs. J. M. A. King; a Himalayan Bear (*Ursus tibetanus*) from North India, presented by Mr. Percy H. Cooper; a Red and Yellow Macaw (*Ara chloroptera*) from South America, presented by Mr. P. J. Prior; a Common Cuckoo (*Cuculus canorus*), British, presented by Mrs. William Smith; a Sharp-nosed Crocodile (*Crocodylus acutus*) from Central America, a Hawk's-billed Turtle (*Chelone imbricata*) from the West Indies, presented by the Rev. W. T. Lax; two Spotted Slow-worms (*Acontias meleagris*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Common Slow-worm (*Anguis fragilis*), British, presented by Mr. H. Scherren; a Ludio Monkey (*Cercopithecus ludio*) from West Africa, a Kit Fox (*Canis velox*) from North America, a Banded Aracari (*Pteroglossus torquatus*) from Central America, an Ethiopian Wart Hog (*Phacochoerus aethiopicus*) from South-East Africa, a Tiger Bittern (*Tigrisoma brasiliensis*) from Brazil, a Common Boa (*Boa constrictor*) from South America, an Indian Eryx (*Eryx johni*) from India, purchased.

#### OUR ASTRONOMICAL COLUMN

COMET 1884 b.—M. Trépied further writes with respect to his observations of the comet discovered by Mr. Barnard:—"I hope you will favourably receive some remarks on the subject of your last article on the Barnard Comet. You say that it would not be prudent to pronounce upon the nature of the orbit on account of the uncertainty which seems to attach to the observations at Algiers. There was in fact an error committed on the first day, in the identification of the star of comparison, but that error was rectified almost immediately, and I am able to state